

# The Changing Priorities of the Center for Disease Control

WILLIAM H. FOEGE, MD, MPH

THE ATTENTION OF THE NATION in the summer of 1976 was focused on Philadelphia, Pa. Within weeks after 4,500 people had gathered in the city for an annual meeting of the State American Legion, 153 of these people were sick, and 29 had died from an unknown illness that struck without warning.

Outbreaks and sporadic cases of disease attributed to the agent of Legionnaires' disease

Location	Dates	Cases	Deaths
<i>Outbreaks</i>			
Washington, D.C. ....	July–August 1965	81	14
Pontiac, Mich. ....	July–August 1968	144	0
Benidorm, Spain ....	July 1973	10	3
Philadelphia, Pa. ....	September 1974	20	2
Philadelphia, Pa. ....	July 1976	221	34
Columbus, Ohio ....	July–August 1977	9	1
Burlington, Vt. ....	May–September 1977	27	14
Kingsport, Vt. ....	August–September 1977	22	3
Los Angeles, Calif ...	May 1977–May 1978	33	6
Bloomington, Ind. ....	May 1977–May 1978	22	4
<i>Sporadic cases</i>			
Various locations ....	August–September 1978	83	21

NOTE: 8 cases of Legionnaires' disease also had been confirmed in the garment district of New York City as of October 1978.

To delineate the outbreak, characterize the patients' clinical symptoms, and establish the determinants of this unexpected new disease occurrence, an investigation involving local, State, and Federal personnel was conducted throughout the cities and towns of Pennsylvania. Months later, scientists of the Center for Disease Control (CDC) isolated a bacterium that they subsequently proved was the cause of the illness. Two years later, research makes it clear that Legionnaires' disease did not begin at the convention in Philadelphia. Probably distributed worldwide, the disease has undoubtedly been leaving clues behind in thousands of laboratories over many decades. However, it was not until laboratory tests

became more sophisticated and other new procedures and tools were developed that scientists could isolate and visualize the culprit organism.

But Legionnaires' disease is only one of the many challenges that CDC has met successfully in its years as part of the Public Health Service. For 32 years it has been working with State and local health departments and international health organizations to meet the challenge of both old and new diseases—always with the ultimate goal of control and prevention. And it is in the Center's success in meeting the challenges of the past that the seeds of challenge for the future lie.

CDC's origins are traced to the problem of malaria in the southern United States, where thousands of troops were trained in World War II. To deal with the threat that the disease posed to the soldiers, the Office of Malaria Control in War Areas was established in 1942. In 1946 this Office officially became the Communicable Disease Center. Through the years an orderly transition has taken place: the Center's emphasis on vector-borne diseases in the 1940s gave way in the 1950s to a broad interest in infectious diseases. In the 1960s, the Center became involved in international, as well as domestic, infectious disease control. Finally, in the 1970s, the Communicable Disease Center became the Center for Disease Control—a name change reflecting an expansion in objectives to include the prevention of all unnecessary morbidity and mortality. In fiscal year 1978, CDC had a budget of more than \$211 million and a staff of 4,000. Approximately half of the staff is located in Atlanta, Ga. Others work in State, city, and county health departments or are assigned abroad.

To reach its major objective, the prevention of unnecessary morbidity and mortality, CDC's present emphasis is directed toward a number of goals: some internal, that is, related to the organization itself and its functional improvement; others external,

*Tearsheet requests to William H. Foege, MD, Director, Center for Disease Control, Atlanta, Ga. 30333*

related to the ways in which CDC will impact on the critical problems of public health.

It would be impossible in a single document to give a complete account of CDC's achievements or to list the priorities for each of its numerous programs. The priorities mentioned here must be accepted with this limitation in mind.

Immediate goals related to the Center itself include (a) the maintenance of quality in routine services, (b) the establishment of direction to insure that the Center is on the right course relative to its objectives, and (c) the provision of sustained support to the disciplines that are basic to all public health control efforts—epidemiology, disease surveillance, laboratory services, and training.

Goals related to CDC's impact on the critical problems of public health include the control of communicable diseases, prevention of chronic diseases, prevention of death and disability related to occupational hazards, and reassessment of the ethics involved in some health activities.

### Internal Priorities

**To maintain quality in routine services.** It is easy for an organization to maintain high-quality performance when it is challenged by the "attack phase" of a problem. An unusual discovery or a heightened awareness of a new challenge will stimulate new ideas, new concepts, and new approaches. It is harder to sustain or maintain action of the highest quality in the more repetitive, daily activities in which routine is the order of the day.

To maintain a high standard in all its activities—laboratory tests, epidemiologic responses to outbreaks, and other routine scientific activities—the Center is placing new emphasis on the improvement of supervision, the formulation of standards, and the assessment of performance.

**To review CDC's direction in the light of current conditions.** As the public health needs of the nation and the world have changed in the past 30 years, so has CDC's mission. To assure that the Center keeps pace with current needs and to provide it direction in doing so, an external committee (chaired by Dr. J. Donald Millar, Assistant Surgeon General and Director, Bureau of State Services, CDC) was recently asked to examine current trends in morbidity and mortality in the United States, to categorize health problems according to the impact that programs designed to control them would have on reducing unnecessary morbidity and mortality, and then, on the basis of that impact, to classify each listed health

problem as of high, medium, low, or no priority. The committee gave the following health problems the highest priority:

- Alcohol and its consequences
- Cancers of medium to high incidence that are subject to prevention or successful intervention when detected early
- Cardiovascular diseases of medium to high incidence that are subject to successful intervention
- Contamination of drinking water
- Dental diseases (notably caries and periodontal)
- Diseases caused by hazardous health exposures in the workplace
- Infant mortality
- Motor vehicle accidents
- Newly recognized diseases and unexpected epidemics of public health significance
- Nosocomial infections
- Smoking and its consequences
- Vaccine-preventable diseases of children

Additional preventable health problems that the committee found of noteworthy significance include the following:

- Arthritis and rheumatism
- Cancer (bladder, lip, mouth, pharynx, skin, uterus, vagina)
- Diabetes
- Disaster-related conditions
- Diseases caused by air pollution
- Genetic diseases
- Inappropriate use of medical services and pharmaceutical products
- Inappropriate use of psychoactive drugs
- Nutrition-related problems
- Occupational accidents
- Infections of low incidence but of potential significance to the community, such as encephalitis, leprosy, plague, and rabies
- Infections of medium to high incidence that are of significance to the community, such as influenza, mycobacterial respiratory diseases, and sexually transmitted diseases
- Renal disease
- Treatable diseases of the central nervous system (for example, epilepsy and Parkinsonism)
- Unwanted pregnancy
- Vision impairment

After the committee classified the health problems according to priority, it was asked to devise a strategy for reducing morbidity and mortality in the categories of highest priority. Finally, because many

of the priorities listed by the committee are dealt with by other parts of the Public Health Service or of the Government, the committee was asked to identify areas that CDC should emphasize. The recommendations are being integrated into the Center's planning. Our experience with this committee has convinced us that a periodic review by outside experts is a good way to establish appropriate directions for the Center's activities.

**To provide sustained support to the disciplines basic to all public health control efforts—epidemiology, disease surveillance, laboratory services, and training.**

Epidemiology can be described as the study of the distribution, determinants, and effects of a disease or a condition on individuals and society. Epidemiologic skills have been emphasized through the years at CDC. They received special recognition in the Epidemic Intelligence Service (EIS), created by Dr. Alexander Langmuir in 1951.

In the past 27 years more than 1,000 epidemiologists have been trained as EIS officers. The officers are schooled in a 2-year program that offers basic classroom work in epidemiology and statistics, combined with a service and training assignment with State health departments, universities, or CDC programs. Because the need for epidemiologists is growing at the Federal, State, and local levels, CDC is committed to increase the number trained each year.

Systems of surveillance of disease, becoming ever more complex, provide the basic data needed to practice epidemiology. The first nationwide disease surveillance system was established in 1950 to collect and analyze data about malaria. Now, for many conditions there are surveillance systems that are based on weekly reports from States, hospitals, universities, numerous researchers, industry, and labor. The information from these reports is also augmented by dozens of investigations each week of unusual occurrences of disease. The Center's influenza surveillance program is an example of such a system. Surveillance of the influenza viruses and the morbidity and mortality they cause provides a national and international measure of influenza activity and its nature.

Surveillance is carried out to detect the influenza virus during times of "seeding," before recognized outbreaks. Specimens from patients with febrile upper respiratory diseases in clinics, hospitals, and emergency rooms across the country are regularly screened. These specimens are then processed at

WHO collaborating laboratories to obtain information on the strain or strains of influenza circulating in the country.

Physicians from 26 States include influenza among reportable diseases, and the data they report are analyzed by CDC. Data on absenteeism are also gathered from industry and schools; approximately 700 institutions participate in this phase of influenza surveillance.

Mortality surveillance is based on the total deaths and the deaths due to pneumonia and influenza tallied each week by vital statistics offices in 121 U.S. cities. This information is telegraphed to the Center, where the reported numbers are compared with the "expected" numbers, based on previous data. This surveillance system gives tools, rough though they may be, to determine the steps required for reducing the impact of influenza.

**Laboratory services as a tool in public health.** In addition to epidemiology and surveillance, quality laboratory services are necessary for the maintenance of effective public health practice and represent one of the basic disciplines to which CDC gives priority.

CDC has an extensive network of laboratories to provide support to other laboratories in the nation, and of equal importance, to provide those laboratories with proficiency testing, suggested standards, and diagnostic reagents. The Center's laboratory staff also provides managerial and technical consultation to other public health workers.

**Training programs.** Supporting the emphasis in all other areas is CDC's commitment to provide opportunities for training in epidemiologic surveillance, laboratory procedures, and public health in general. As many as 15,000 persons per year are trained in courses held at CDC or given by CDC in various States and foreign locations. Telephone lectures and home study courses are also used for training health and scientific professionals.

The Center for Disease Control is also accredited for continuing medical education and offers courses that meet the criteria for category I, hour-for-hour credit, for the Physician's Recognition Award of the American Medical Association.

### **External Priorities**

**Infectious diseases.** In spite of many victories over communicable disease during the 20th century, challenges remain.

In a poliomyelitis outbreak in 1952 that struck

58,000 Americans, 1,400 persons died. Thousands of others were confined to wheelchairs or had their mobility limited by steel braces. By the 1970s, the number of poliomyelitis cases had been reduced to one or two dozen per year, many of these cases being caused by the vaccine itself. Then later on in the 1970s, a new problem arose. In the face of apathy about childhood immunizations, 35 to 40 percent of America's children were not adequately immunized against poliomyelitis. This pool of susceptible children, still sizable today, has raised fears that explosive epidemics might occur reminiscent of the 1950s.

In the early 1960s, some 400,000 cases of measles were reported in the United States each year. Introduction of measles vaccine in the middle of that decade, however, resulted in a dramatic decline in the number of reported cases of the disease. Nevertheless, in 1977 the number of reported cases climbed to more than 54,000. Again, the problem could be traced to the inadequate immunizations of large numbers of children despite the availability of an inexpensive, cost-beneficial procedure.

To combat parental apathy, the Secretary of Health, Education, and Welfare, Joseph A. Califano, Jr., launched a major national campaign in 1977 to immunize the nation's unprotected children. The goal of raising immunization levels to 90 percent by late 1979 is an ambitious—and some say impossible—objective. However, it is unconscionable for a nation spending more than \$170 billion a year on health care to neglect a proven and inexpensive method of safeguarding its children against preventable suffering and death.

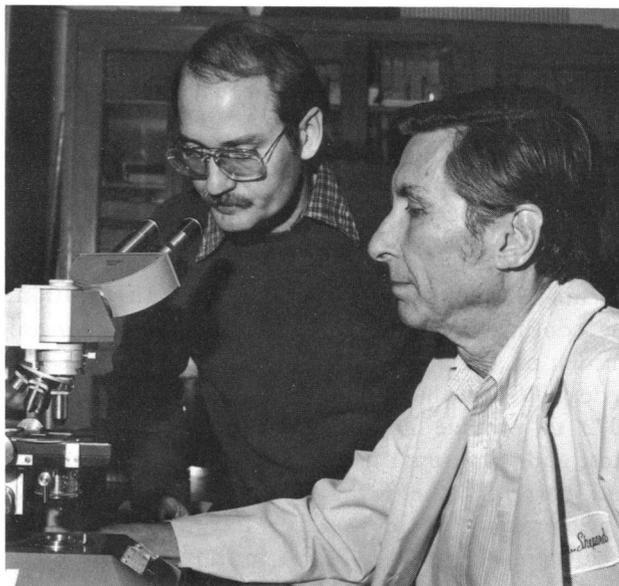
As recently as 1948, tuberculosis was causing 137,000 new infections per year. Since then, however, a steady and continuing decline has occurred, so that only 30,000 cases were reported in 1977. In spite of this favorable trend, some resistant tuberculous strains cause concern—particularly those resistant to isoniazid, PAS (para-aminosalicylic acid), and streptomycin.

Another emerging problem is that of hospital-acquired infections. It is estimated that 2 million patients a year in the United States acquire an infection while in a hospital and that their care requires more than \$1 billion in health care expenditures. Yet it is also estimated that 50 percent of all nosocomial infections are preventable with our available technology. CDC is therefore increasing its work in this area in the belief that the number of nosocomial infections can be decreased by 20 percent over the next 5 years.

**Appearance of new diseases.** As the fight against traditional communicable disease continues, newer disease entities vie for public health resources. Much attention has been focused on the isolation of the Legionnaires' disease bacterium, the first bacterium causing significant human disease that has been discovered in almost 20 years. In contrast, new viruses that are significant causes of human illness are being discovered with amazing frequency. In the 1940s, 3 such new viruses were described; in the 1950s, 10; in the 1960s, 9; and in the 1970s to date, also 9.

Of special concern is a group of viruses that are classified as Class IV because of their virulence, the lack of a vaccine to protect laboratory workers from them, and their possible transmission as aerosols. CDC has designed and built a maximum containment laboratory in which to study these viruses because of their potential threat to the United States and the rest of the world. This facility's special design reduces the risk of the scientists acquiring infections in the laboratory as they do research on the organisms and the illnesses that the viruses cause.

**The chronic diseases.** At CDC we will continue working through State and local health departments to reduce the impact of sexually transmitted disease and also will continue the fight against environmental hazards, such as lead-based paint poisoning or dangerous air particulates. However, at the same time we must be ready to cope with new problems. Dramatic progress has been made in the past in



*Dr. Joseph McDade (left) and Dr. Charles Shepard, scientists of the Center for Disease Control, who isolated the Legionnaires' disease bacterium in January 1977*

working to improve the environment, and that will continue even as we turn more of our attention to teaching people how to attain better health by virtue of their own decisions.

Much of the improvement in life expectancy in the 20th century can be attributed to the prevention of communicable disease. If we look to the century's final two decades, it appears equally obvious that further improvements in life expectancy and reduced morbidity will result from the prevention of the chronic diseases. As with the communicable diseases, the outcome of the fight will depend upon the collection of relevant data through surveillance systems, analysis of these data by the best epidemiologic techniques, and the establishment of appropriate control programs.

Use of the traditional public health techniques against the chronic, noninfectious diseases is becoming commonplace. In the fall of 1977, the Diabetes Control Activity at CDC contracted with the health departments in 10 States (Colorado, Georgia, Illinois, Maine, Michigan, Mississippi, Nebraska, New York, Rhode Island, and South Carolina) to conduct community diabetes control demonstration projects. The staffs of the pilot projects have now assembled baseline data on diabetes morbidity, mortality, and care resources and have set 5-year goals, namely, (a) to reduce excess days of hospitalization of persons with diabetes by 50 percent, (b) to eliminate the tenfold excess in perinatal mortality associated with the pregnancies of diabetic women, and (c) to reduce by 50 percent the deaths associated with diabetic coma in juvenile diabetics.

Twenty-five years ago, death was the only alternative for a patient with end-stage renal disease. Today, increased medical knowledge and modern technology have made renal dialysis and kidney transplant a way of life for many patients.

Yet for the dialysis patient and his or her family, chronic debilitation and dependence on the dialysis machine can create serious difficulties. In addition, the continuing expense of dialysis puts a financial burden on the patient and also escalates costs to the Federal Government. Legislation was enacted in 1972 to provide Federal Government support for most end-stage renal disease patients in the country, and currently the Federal Government is paying approximately \$1 million per day for the care of such patients who are eligible for government assistance. Even home dialysis, the least expensive form of dialysis, is estimated to cost \$14,000 the first year of treatment and \$7,000 per year thereafter.

Kidney transplant seems to be the best long-term solution to the problem of 60 to 70 percent of end-stage renal disease patients, those who have no kidney function remaining. The logistics of kidney transplant, however, have interfered with significant use of this procedure. The Center therefore is engaged in programs with selected States to increase the number of kidneys available for transplant from cadavers. These programs have demonstrated that more kidneys can be retrieved and successfully transplanted by using certain techniques, and these techniques are being extended to other geographic areas to determine the feasibility of expanded programs.

The hundreds of thousands of excess deaths occurring each year in the United States as a result of cigarette smoking continue to be a public health disgrace. It has been clear for many years that lives could be salvaged and much suffering prevented by a reduction in cigarette smoking. Yet the approach of public health professionals to this major 20th century epidemic has not been consistent, probably because of the political and economic implications. As part of the new Public Health Service emphasis on smoking and health, CDC is developing health education approaches, undertaking epidemiologic studies, and providing grants to States to establish programs seeking innovative solutions to the problem of tobacco-related death and disability.

**Occupational health.** A current major public health problem that will continue into the future is the identification of harmful substances in the workplace or of harmful work practices and the establishment of remedial programs. As with the chronic diseases, the major solution will be found in application of the proven public health techniques—epidemiology, surveillance, laboratory testing, training, and control. Because occupational health has frequently developed along separate lines from public health, one of the challenges of our day is to incorporate occupational safety and health into the mainstream of public health as a responsibility of State and local health departments as well as of the Federal Government.

Meanwhile attention is being given to the development of criteria documents through CDC's National Institute for Occupational Safety and Health (NIOSH). In such documents all the available information is analyzed in arriving at recommended standards for safe levels of exposure to chemical and physical hazards in the workplace. The documents contain suggested ways of controlling exposure, ways to measure exposure, and suggested recordkeeping

requirements. They are the technical basis for standards that will be promulgated by the Occupational Safety and Health Administration. NIOSH completes approximately 24 criteria documents a year.

Health hazard evaluations, another activity of high priority, is done at the request of employers or representatives of employees. Once a request is made, NIOSH has an official right of entry into workplaces. The evaluations are done to determine whether substances found in the workplace have potentially toxic effects at the concentrations used. Following the evaluation, the determinations are submitted to both employers and employees. In fiscal year 1977, the Institute completed 129 evaluations.

NIOSH conducts some 40 industrywide studies a year to determine the effect of long-term exposures to low levels of industrial materials and of long-term exposure to processes and stresses that may cause illness, disease, or loss of ability to function. The purpose is to assemble basic information about deaths and disabilities related to occupations. Among NIOSH's study subjects are grain-handling industries, sulphuric acid and sulphate-related industries, coal-fired power plants, and the painting trades.

NIOSH is also making resources and personnel available to educational centers throughout the country to enable them to serve as training centers and foci of occupational safety and health expertise.

**International health.** The growing interdependence of nations makes it clear that our future must be viewed in a global context. Since the mid-1960s, CDC has contributed more than 300 persons, for both long- and short-term assignments, to the global battle against smallpox.

The United States has not had a case of smallpox since 1949, and therefore few people recognize the national benefits derived from global smallpox eradication. The approximately \$27 million that the United States has invested in the battle against smallpox since 1965 is regained every 3 months because smallpox vaccination programs are no longer required in the United States, vaccine complications and deaths no longer occur, and the resources formerly used for foreign quarantine activities can be diverted to other activities.

CDC is committed to international health, not only for the benefits that accrue to U.S. citizens, but also for the benefits to other global citizens. High priority is given to programs to make immunizations available to all children of the world by 1990. Priority is also given to programs for improving global disease surveillance, to the WHO Tropical

Diseases Research Program, and to international programs providing expert assistance to family planning, nutrition, and environmental and occupational health.

**Public health ethics.** One of the greatest challenges we face in the next 100 years is to establish a framework in medical schools and schools of public health in which to practice and teach the ethics of public health. Traditionally, medical ethics has been taught from the perspective of the individual patient, and this perspective is the one most familiar to the American public. With increasing insistence, however, other voices are being heard on the subject of societal medical ethics. Although recognizing the individual's freedom of choice, these voices point up the general responsibility for a consideration of society's needs, too. Does the concentration of medical resources on certain conditions or persons prevent or delay the delivery of better health to larger numbers? Does high-cost curative medicine serve as a deterrent to the provision of the resources needed for prevention? What is society's responsibility to a person who is inadvertently injured in a program designed to improve the public health?

We must make the definition, delineation, and teaching of public health ethics a priority if we are to assist public health decision makers in allocating resources, provide them with guidance in the confusing areas of informed consent and liability, and help them achieve a reasonable balance between freedom of information and confidentiality.

### **The Bottom Line**

As CDC faces its future, the challenges and opportunities may seem familiar. Communicable diseases will continue to exact a toll. Disease organisms will continue to resist our medicines, requiring continued research. The difficulties involved in the delivery of prevention must be met.

The chronic diseases, now so significant in terms of preventable morbidity and mortality, raise even more difficult questions. One is hard put to find profit or enjoyment from, or a kind word to say for tuberculosis, typhoid, or streptococcal throat. However, overeating, overdrinking, smoking, and fast cars are frequently depicted as part of "the good life."

In the past our problems have been, and in the future will continue to be, dominated by the difficulties of navigation—making certain we are headed in the right direction at the right speed.